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10/574,844	04/06/2006	Ryoji Funahashi	062327	5027

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EXAMINER	
SALZMAN, KOURTNEY R	

ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
09/18/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentmail@whda.com

Office Action Summary	Application No.	Applicant(s)	
	10/574,844	FUNAHASHI, RYOJI	
	Examiner	Art Unit	
	KOURTNEY R. SALZMAN	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 June 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *4-7,13,14,17 and 18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *4-7, 13, 14, 17 and 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 23, 2009 has been entered.

Summary

2. Claims 4, 5, 13, 14 and 18 are currently amended. Claims 1-3, 8-12 and 15-16 are cancelled. Claims 4-7, 13, 14, 17 and 18 are currently pending and have been fully considered.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims 4-6, 13, 14 and 17-18 are rejected under 35 U.S.C. 102(a) as being clearly anticipated by FUNAHASHI et al (Funahashi, R., S. Urata, K. Mizuno, T. Kouuchi, and M. Mikami. "Ca2.7Bi0.3Co4O9/La0.9Bi0.1NiO3 Thermoelectric Devices with High Output Power Density." *Applied Physics Letters* 85.6 (2004): 1036-1038.).

Regarding claims 4 and 5, FUNAHASHI et al teaches a thermoelectric device with a p-type leg and a paste with a p-type powder within in the abstract. Regarding the p-type oxide, FUNHASHI et al teaches a $Ca_{2.7}Bi_{0.3}Co_4O_9$ composition in the abstract as well. The subscripts provided in FUNAHASHI et al fall within every category required by the instant application, when the d subscript of the A^2_d is set to 0. FUNAHASHI et al also teaches the paste to contain Ag particles with the p-type oxide powder defined above in the third paragraph.

Regarding claim 6, FUNAHASHI et al teaches weight percents of the oxides of 1.5, 6 and 10% in the fourth paragraph.

Regarding claims 13 and 14, FUNAHASHI et al teaches a thermoelectric with p-type oxide legs and n-type oxide legs and pastes comprising these oxide leg materials, as stated in the abstract. FUNAHASHI et al teaches the first formula for the p-type material in the title and abstract as $Ca_{2.7}Bi_{0.3}Co_4O_9$. The subscripts provided in FUNAHASHI et al fall within every category required by the instant application, when the d subscript of the A^2_d is set to 0. FUNAHASHI et al teaches the first n-type formula of the instant application in the title and abstract as $La_{0.9}Bi_{0.1}NiO_3$. The subscripts provided in FUNAHASHI et al fall within every range required by the instant application, when the q subscript of R^2_q is set to 0. FUNAHASHI et al also teaches the paste to contain Ag particles with the p-type oxide and n-type powders defined above in the third paragraph.

Regarding claims 17 and 18, FUNAHASHI et al shows this structure in figure 5.

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 4-7 are rejected under 35 U.S.C. 103(a) as being obvious over XU et al (Xu, Gaojie, Ryoji Funahashi, Masahiro Shikano, Qirong Pu, and Biao Liu. "High Temperature Transport Properties of Ca3-xNaxCo4O9." *Solid State Communications* 124 (2002): 73-76.), in view of ALEXANDER (US 5,422,190).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Regarding claims 4 and 5, XU et al teaches the p-type complex oxide in the bottom left hand column of page 74 to be $Ca_{2.7}Na_{0.3}Co_4O_9$. The subscripts provided in FUNAHASHI et al fall within every category required by the instant application, when the d subscript of the A^2_d is set to 0. XU et al teaches the use of a paste of metal for use with the thermoelectrics in the left column of page 74 in the Experimental Method section.

XU et al fails to teach the combination of a metal and oxide material to form a paste.

ALEXANDER teaches an electrically conductive paste comprising a metal and oxide material for use in electronics in the abstract. The via fill paste is stated, in column 1, lines 27-30, "to provide an electrical bridge or connection between the conductive layers". The fill paste is said to be made of gold, silver and palladium and an oxide. Column 3, lines 25-42, repeatedly prescribe the use of metal powders in the paste.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to add a metal, as disclosed in ALEXANDER, to the oxide of XU et al to create a conductive paste, as metal is obviously used when electrical conduction is a desirable characteristic, as shown in ALEXANDER and in XU et al on page 74 as cited above.

Regarding claim 6, the amount of oxide present relative to the amount of metallic powder is best shown in the example contained in TABLE 1 of ALEXANDER. If the ratio of parts of oxide per 100 parts of metallic particles is calculated, this example shows approximately 6.57 parts of the oxide are present per 100 parts of metallic

powder. This value is included in the range of the instant application. In the alternative, the amount of metal added to the conductive paste effects the conductivity through electrical components or between the semiconductors. When more metallic material is used in the paste, the easier it becomes for the paste to conduct the electricity through the thermoelectric device. The optimization of the amounts of oxide relative to the amount of metallic material would be determinable through routine experimentation.

Regarding claim 7, both a vehicle, or resin of the instant application, and glass binder are used to create a silver paste, as detailed in table II, for example, in column 5, of ALEXANDER. A vehicle is said to be used to produce the paste and is "typically a resin dissolved in a solvent" (column 3, lines 61-63).

7. Claims 4-7 are rejected under 35 U.S.C. 103(a) as being obvious over FUNAHASHI et al '381(JP 2003-306381), in view of ALEXANDER (US 5,422,190).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the

application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Regarding claims 4 and 5, FUNAHASHI et al '381 teaches the p-type complex oxide in the abstract to be $Bi_{1.6-2.2}Pb_{0-0.5}Sr_{1.6-2.2}Co_4O_9$. The subscripts provided in FUNAHASHI et al '381 fall within every category required by the instant application, where M^1 is Sr and the subscript j of M^2 is set to 0.

FUNAHASHI et al '381 et al fails to teach the combination of a metal and oxide material to form a paste.

ALEXANDER teaches an electrically conductive paste comprising a metal and oxide material for use in electronics in the abstract. The via fill paste is stated, in column 1, lines 27-30, "to provide an electrical bridge or connection between the conductive layers". The fill paste is said to be made of gold, silver and palladium and an oxide. Column 3, lines 25-42, repeatedly prescribe the use of metal powders in the paste.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to add a metal, as disclosed in ALEXANDER, to the oxide of FUNAHASHI et al '381 to create a conductive paste, as metal is obviously used when electrical conduction is a desirable characteristic, as shown in ALEXANDER.

Regarding claim 6, the amount of oxide present relative to the amount of metallic powder is best shown in the example contained in TABLE 1 of ALEXANDER. If the

ratio of parts of oxide per 100 parts of metallic particles is calculated, this example shows approximately 6.57 parts of the oxide are present per 100 parts of metallic powder. This value is included in the range of the instant application. In the alternative, the amount of metal added to the conductive paste effects the conductivity through electrical components or between the semiconductors. When more metallic material is used in the paste, the easier it becomes for the paste to conduct the electricity through the thermoelectric device. The optimization of the amounts of oxide relative to the amount of metallic material would be determinable through routine experimentation.

Regarding claim 7, both a vehicle, or resin of the instant application, and glass binder are used to create a silver paste, as detailed in table II, for example, in column 5, of ALEXANDER. A vehicle is said to be used to produce the paste and is "typically a resin dissolved in a solvent" (column 3, lines 61-63).

8. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being obvious over XU et al (Xu, Gaojie, Ryoji Funahashi, Masahiro Shikano, Qirong Pu, and Biao Liu. "High Temperature Transport Properties of Ca3-xNaxCo4O9." *Solid State Communications* 124 (2002): 73-76.) or FUNAHASHI et al '381 (JP 2003-306381) and YOSHIMOTO et al (US 5,352,299) or FUNAHASHI et al '686 (WO 03/081686), in view of ALEXANDER (US 5,422,190).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in

the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Regarding claim 13, both XU et al and FUNAHASHI et al '381 teach p-type complex oxides as described in their abstracts. XU et al teaches the p-type complex oxide in the bottom left hand column of page 74 to be $Ca_{2.7}Na_{0.3}Co_4O_9$. The subscripts provided in XU et al fall within every range required by the instant application, when the d subscript of the A^2_d is set to 0. XU et al teaches the use of a paste of metal for use with the thermoelectrics in the left column of page 74 in the Experimental Method section. XU et al also teaches the paste to be of us in the attachment of the p-legs to the substrate on page 74. FUNAHASHI et al '381 teaches the p-type complex oxide in the abstract to be $Bi_{1.6\text{-}2.2}Pb_{0\text{-}0.5}Sr_{1.6\text{-}2.2}Co_4O_9$. The subscripts provided in FUNAHASHI et al '381 fall within every range required by the instant application, where M^1 is Sr and the subscript j of M^2 is set to 0.

Neither XU et al nor FUNAHASHI et al '381 teach p-type oxides or the combination of a metal and oxide material to form a paste.

Both YOSHIMOTO et al and FUNAHASHI et al '686 teach n-type complex oxides as described in their abstracts. YOSHIMOTO et al teaches the n-type complex oxide to be $(Ln_{1-x}A_x)_2MO_4$. A is an alkali earth metal, like Na or K, which are listed in the instant application and M represents a transition metal like component Ni listed in the composition in the instant application. The subscripts provided in YOSHIMOTO et al fall within every range required by the instant application, when the subscript v of R^4_v is set to 0. FUNAHASHI et al '686 discloses both formulas claimed in the instant application. The first formula disclosed in the abstract is $La_{1-x}M_xNiO_{2.7-3.3}$, where the subscripts fall within every range required of the first claimed n-type material of instant application, when the M is the same as the R^1 and the q subscript of the R^2_q is set to 0. FUNAHASHI et al '686 also discloses a second formula in the abstract which corresponds to the second n-type formula disclosed in the instant application. The composition is $(Ln_{1-x}M_x)_2NiO_{3.6-4.4}$, where M is the same as R^3. The subscripts fall within every range of the instant application, when the subscript v of R^4_v is set to 0.

XU et al, FUNAHASHI et al '381, YOSHIMOTO et al and FUNAHASHI et al '686 all fail to teach the combination of a metal and oxide material to form a paste.

ALEXANDER teaches an electrically conductive paste comprising a metal and oxide material for use in electronics in the abstract. The via fill paste is stated, in column 1, lines 27-30, "to provide an electrical bridge or connection between the conductive layers". The fill paste is said to be made of gold, silver and palladium and an

oxide. Column 3, lines 25-42, repeatedly prescribe the use of metal powders in the paste.

In addition to the use of the oxides as p-type and n-type legs, it would have been obvious to one of ordinary skill in the art at the time of invention to add a metal, as disclosed in ALEXANDER, to the oxides of XU et al, FUNAHASHI et al '381, YOSHIMOTO et al or FUNAHASHI et al '686 to create a conductive paste, as metal is obviously used when electrical conduction is a desirable characteristic, as shown in ALEXANDER and in XU et al on page 74 as cited above.

Regarding claim 14, both XU et al and FUNAHASHI et al '381 teach p-type complex oxides as described in their abstracts. XU et al teaches the p-type complex oxide in the bottom left hand column of page 74 to be $Ca_{2.7}Na_{0.3}Co_4O_9$. The subscripts provided in XU et al fall within every range required by the instant application. XU et al teaches the use of a paste of metal for use with the thermoelectrics in the left column of page 74 in the Experimental Method section. XU et al also teaches the paste to be of us in the attachment of the p-legs to the substrate on page 74. FUNAHASHI et al '381 teaches the p-type complex oxide in the abstract to be $Bi_{1.6\text{-}2.2}Pb_{0\text{-}0.5}Sr_{1.6\text{-}2.2}Co_4O_9$. The subscripts provided in FUNAHASHI et al '381 fall within every range required by the instant application, when M^1 is Sr.

Neither XU et al nor FUNAHASHI et al '381 teach p-type oxides or the combination of a metal and oxide material to form a paste.

Both YOSHIMOTO et al and FUNAHASHI et al '686 teach n-type complex oxides as described in their abstracts. YOSHIMOTO et al teaches the n-type complex oxide to

be $(Ln_{1-x}A_x)_2MO_4$. A is an alkali earth metal, like Na or K, which are listed in the instant application and M represents a transition metal like component Ni listed in the composition in the instant application. The subscripts provided in YOSHIMOTO et al fall within every range required by the instant application. FUNAHASHI et al '686 discloses both formulas claimed in the instant application. The first formula disclosed in the abstract is $La_{1-x}M_xNiO_{2.7-3.3}$, where the subscripts fall within every range required of the first claimed n-type material of instant application, when the M is the same as the R^1. FUNAHASHI et al '686 also discloses a second formula in the abstract which corresponds to the second n-type formula disclosed in the instant application. The composition is $(Ln_{1-x}M_x)_2NiO_{3.6-4.4}$, where M is the same as R^3. The subscripts fall within every range of the instant application.

XU et al, FUNAHASHI et al '381, YOSHIMOTO et al and FUNAHASHI et al '686 all fail to teach the combination of a metal and oxide material to form a paste.

ALEXANDER teaches an electrically conductive paste comprising a metal and oxide material for use in electronics in the abstract. The via fill paste is stated, in column 1, lines 27-30, "to provide an electrical bridge or connection between the conductive layers". The fill paste is said to be made of gold, silver and palladium and an oxide. Column 3, lines 25-42, repeatedly prescribe the use of metal powders in the paste.

In addition to the use of the oxides as p-type and n-type legs, it would have been obvious to one of ordinary skill in the art at the time of invention to add a metal, as disclosed in ALEXANDER, to the oxides of XU et al, FUNAHASHI et al '381,

YOSHIMOTO et al or FUNAHASHI et al '686 to create a conductive paste, as metal is obviously used when electrical conduction is a desirable characteristic, as shown in ALEXANDER and in XU et al on page 74 as cited above.

9. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over XU et al (Xu, Gaojie, Ryoji Funahashi, Masahiro Shikano, Qirong Pu, and Biao Liu. "High Temperature Transport Properties of Ca3-xNaxCo4O9." *Solid State Communications* 124 (2002): 73-76.) or FUNAHASHI et al '381 (JP 2003-306381) and YOSHIMOTO et al (US 5,352,299) or FUNAHASHI et al '686 (WO 03/081686), in view of ALEXANDER (US 5,422,190), as applied to claim 13 above, and further in view of BUIST (US 4,859,250).

The combination of the materials disclosed in XU et al, FUNAHASHI et al '318, YOSHIMOTO et al and FUNAHASHI et al '383, connected with the paste disclosed in ALEXANDER, fails to disclose the location of the thermoelectric components in the thermoelectric device.

Regarding claim 17, BUIST teaches in figure 3A the location and connection of p-type and n-type semiconductors. The semiconductors are shown to be attached to a substrate, reference number 24, as described in the column 4 line 14- 45 description of the figure. The thermoelectric element includes the n-type conductor (reference number 64), p-type conductor (reference number 66) and connection between the two (reference number 82). Each element is shown connected in series. The unconnected end of the p-type semiconductor is

electrically connected to the unconnected end of the n-type semiconductor using lead, reference number 80. This is method of connection is conventional to one of ordinary skill in this art. Therefore, the connection of an n-type and p-type semiconductor via an unconnected end would be obvious.

Regarding claim 18, BUIST utilizes the configuration of thermoelectric elements, as in the rejection of claim 15, shown in figure 3A, and forms the elements into strips affixed to the flexible plastic substrate. In column 5, lines 5-8, BUIST teaches, "the thermoelectric elements are folded to combine all cold strings on a first plane and all hot strips on a second plant opposing the first plane of cold strips". Shown in figure 4, the hot side is compiled on one end of the modulus, while the cold side is complied opposite.

At the time of invention, one of ordinary skill in the art would find it obvious to organize the combination of the materials disclosed in XU et al, FUNAHASHI et al '318, YOSHIMOTO et al, FUNAHASHI et al '383 and ALEXANDER in the manner of BUIST because the layout of similar temperature elements on opposing sides is obvious. It is intuitive to place the cold strip elements on one side of the thermoelectric modulus and the hot elements on the other because a thermoelectric device is usually used to generate power from a temperature gradient on two different sides of the device. The organization of the elements taught by XU et al, FUNAHASHI et al '318, YOSHIMOTO et al, FUNAHASHI et al

'383 and ALEXANDER in the pattern of BUIST is obvious as it allows the thermoelectric device to function efficiently.

Response to Arguments

10. Applicant's arguments filed June 23, 2009, as relevant to the application of the reference ALEXANDER, have been fully considered but they are not persuasive. The arguments relevant to the application of ALEXANDER will be discussed below.

11. Moreover, the arguments regarding the formulaic composition not being shown in the previous rejection is moot as well, as a new ground of rejection in the form of XU et al, FUNAHASHI et al '686 and '381 and YOSHIMOTO et al, has been applied to address the amendments filed June 23, 2009.

12. Applicant argues ALEXANDER is not applicable because "this paste is aimed at solving the problem of connecting a layer of conductive gold to a layer of conductive silver" on page 10.

a. ALEXANDER actually discloses the use of the paste to electrically connect two pieces of dissimilar materials, which doesn't limit the application of a conductive paste to only gold and silver layers. That application is merely one intended use of the paste. Its application as a conductor makes it for use in any situation where conduction is necessary, as in the instant application.

13. Applicant argues on page 11 that ALEXANDER et al does not teach the use of adding a metal to an oxide to provide electrical conductivity.

b. The examiner is unclear how the addition of a conductive metal such as those listed in ALEXANDER would not provide conductivity, since the particles

added would be conductive. The paste of ALEXANDER is made of oxides and metal, where at the very least the metal is known to be conductive. Furthermore, the applicant has selected one intended use of ALEXANDER, but as discussed above, this is not limiting, as is discussed in column 6, lines 42-49.

14. Applicant argues, on page 11, the choice of a conductive oxide like those cited in this action, would not be substitutable for the refractory oxide of ALEXANDER because refractory oxides "do not require electrical conductivity".

c. As admitted in the above statement, refractory oxides can have conductivity. It would be a logical and obvious choice to add a conductive oxide as the oxide of ALEXANDER, as ALEXANDER seeks to make a conductive paste. Therefore, the use of any pieces which increase the conductivity would increase the goal of the paste. The use of the thermoelectric oxides with conductivity would be obvious and with justification.

Double Patenting

15. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to

be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

16. Claims 4-7, 13, 14, 17 and 18 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-9 of copending Application No. 10/593,644 in view of FUNAHASHI et al (Funahashi, R., S. Urata, K. Mizuno, T. Kouuchi, and M. Mikami. "Ca2.7Bi0.3Co4O9/La0.9Bi0.1NiO3 Thermoelectric Devices with High Output Power Density." *Applied Physics Letters* 85.6 (2004): 1036-038.). Application 10/593,644 discloses the p-type and n-type materials of the instant application, but fails to show the use of these oxides in a paste. FUNAHASHI et al discloses these oxides within the use of a paste in a thermoelectric. Although the claims of application 10/593,644 include additional limitations not set forth in the claims of the instant application, the claims of the instant application (other than the limitations rendered obvious by FUNAHASHI et al) fully encompass the claimed invention of application 10/593,644.

This is a provisional obviousness-type double patenting rejection.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KOURTNEY R. SALZMAN whose telephone number is (571)270-5117. The examiner can normally be reached on Monday to Thursday 6:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

krs
9/11/2009